NGIX Planning

From a Perpective of R&E Network Infrastructure Transition

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What's an NGIX?

- Exchange point to enable peering of JET networks
- Set of functionality and performance criteria we are defining in JET; not necessarily a dedicated facility
- Driven by short-term objective of interconnecting current JET nets but also longer term view of evolving high performance R&E infrastructure
- HPNSPs (being defined by NSF) use of NGIXes should be a goal

Policy Issues

- NGIX is a Layer-2 AUP-free facility
- Coming to an NGIX doesn’t automatically mean peering agreement (no- cost/no-settlement or even for fee) with other networks; peering is a bilateral
- JET does NOT deal with policy issues

JET Networks

- Current 6:

ESnet

(DREN & iDREN)

- DISA nets (e.g., NIPRnet)? Other agencies?
- Future HPNSPs?

Selection Process

- JET networks will select what NGIXes to go to
- No government solicitation
- Meeting the JET requirements and mutual agreement of some (even 2) JET nets to use an exchange facility will make it an NGIX as long as it would be open to other JET nets to use, otherwise it would be a “private” interconnect point

Current JET nets peering

Nets	DREN / iDREN	ESnet	NISN	NREN	vBNS
DREN / iDREN		Sprint NAP AIX	?	none	MAE-East Sprint NAP AADS NAP (AIX (F) SDSC
ESnet	Sprint NAP AIX		MAE-East AIX	none	MAE-East PYM Sprint NAP AADS NAP AIX (F) SDSC
NISN	?	MAE-East AIX		?	MAE-East
NREN	none	none	?		PYM (F) AADS NAP AIX (F)
vBNS	MAE-East Sprint NAP AADS NAP (AIX (F) SDSC	MAE-East PYM Sprint NAP AADS NAP AIX (F) SDSC	MAE-East	PYM (F) AADS NAP AIX (F)	

(F)=future planned interconnect/peering

How many NGIXes and what locations?

- We have agreed to 3 metro areas as the initial set of NGIXes: Washington DC, Chicago, SF Bay area
  (ESnet decision pending)
- Some candidates:
  - SF Bay area: AIX (NASA-Ames)
  - Chicago: AADS-NAP/MREN/STAR-TAP
  - Washington DC: UMCP/MAX/Bell Atlantic
    NASA-Goddard
    MFS/Worldcom
- Potential sites for the second set: San Diego, Atlanta, Houston, NYC

Location Issues

- Need a neutral zone: government and university sites provide that but may have business issues; LECs may no longer prove such a zone with all IXC-LEC mergers
- Existence of multiple carriers with fiber built to the NGIX facility and moderately priced and quickly available Sonet circuits (especially OC-12c)

Switching Fabric

- An ATM switch as the initial minimum switch fabric
- Deep buffers (need to specify MBS?)
- OC-3c and OC-12c interfaces required; DS-3 optional
- VBR and UBR support required
- SVC support optional (what signalling, what addressing anyways?)
- Gigabit Ethernet as an additional fabric?
- Need to track WDM development (passive star couplers, active wavelength routers, etc.)

Collocations Space

- Needed for routers as well as Layer 1/2 boxes deployed bilateral separate from the “public” fabric
- Collocation space is key for POS networks (Abilene, vBNS OC-48c)
- Should we specify a required square footage (say 500-1000 Sq ft) since that implies dedicated facility?
- Collocated equipment will be owned by the networks not NGIX operator
- Can NGIX operator sell collocation service to a JET net and not to a small ISP (e.g., tying collocation service to port speed to link type)??

Management & Operation

- Need to define facility management requirements (power, temperature and humidity control, escorted access, equipment security, etc.)
- Staffing required: 24x7 support with two hour response time?
- Use of network management tools and coordination between NGIX operators
- Support for measurement tools deployment; collaboration with NLANR

Business Issues

- Startup cost could be an issue for a university operator
- Issuing contracts and collecting service fees might be an issue for a government site (but AIX has done this)
- Need candidate operators to quickly come up with rough estimates for various service pricing

NGIXes and GigaPoPs

- Collocating an NGIX and a GigaPoP node where GigaPoP connects to I2 backbones would save circuit costs for I2 backbones and for those fednets that want to connect to that GigaPoP
- If there is no one such node in a GigaPoP (different I2 and fed backbones connect to different nodes) then a distributed NGIX over the GigaPoP infrastructure could work
- MREN, CalREN-2 and MAX should join the NGIXes planning as the GigaPoPs in the initial 3 areas selected

NGIXes and DARPA Supernet

- Initial 3 metro areas seem to be good choices for Supernet as well given its topology
- Supernet all-optical technology development should be of interest to JET nets
- DARPA NGI funded testbeds and JET organizations could collaborate in prototyping future cross-connect and switching technologies at NGIXes